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ABSTRACT

To study the extent to which environment affects or controls learning and communication, an exploratory case study examined the effects of a "novel" classroom environment on student and teacher interaction within the classroom. Freshman students in a traditional expository writing and speaking course at a large midwestern university met in a computer lab where they sat in office-style swivel chairs, each at a terminal. Classroom observations revealed a number of problems which included: (1) the terminals prevented interaction across tables; (2) the terminals presented obstacles during speeches--speakers had to "skip" over the computer to have eye contact; (3) the view of the instructor was hindered; and (4) the office-style swivel chairs made a distracting, squeaking noise. A survey which was administered to all 16 students present during the last observation revealed the majority (94%) found the facility to be moderately adequate to very poor, and 31% felt the presence of computer equipment distracted from the quality of their work, while 25% felt it barely distracted at all. Educators need to take a close look at what is happening in their classrooms due to the physical surroundings. (Author/NH)

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WHEN NOVELTY ISN'T ENOUGH: A CASE STUDY OF STUDENTS' REACTIONS TO TECHNOLOGY IN THE CLASSROOM ENVIRONMENT

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WHEN NOVELTY ISN'T ENOUGH:
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ABSTRACT

General estimates indicate that while about 75% of learning is accounted for by motivation, meaningfulness, and memory, the remaining 25% of learning is dependent upon the effects of the physical environment (Fulton, p. 48). However, there is little research available to document the extent environment effects or controls learning and communication in the classroom (Fulton, 1988, p. 53). This exploratory case study attempts to look at the effects a "novel" classroom environment has on student and teacher interaction within the classroom. Using the ethnographic techniques of observation, interview, and survey, this study focuses on how interaction is effected when a "traditional" subject is taught in the "non-traditional" surroundings of a computer lab. Results of the case study indicate that students are less likely to interact with each other during class discussions in this environment. It was also discovered that many students are uncomfortable around computers in general and the presence of computers in a non-computer classroom may effect interaction and attention in a negative way. For these reasons, educators need to start taking a closer look at what is happening to classroom interactions due to physical surroundings.

WHEN NOVELTY ISN'T ENOUGH: A CASE STUDY OF STUDENTS' REACTIONS TO TECHNOLOGY IN THE CLASSROOM ENVIRONMENT

INTRODUCTION

While it is generally acknowledged that the physical environment does have an effect on learning, there is little research available to document the extent environment effects or controls learning (Fulton, 1988, p. 53). It seems logical that the physical environment has the potential to detract from student-teacher interaction as well, and Fulton challenges adult educators to address this matter in a more systematic and verifiable way (p. 53). The purpose of this exploratory case study is to begin to address what effects a novel classroom environment may have on interaction in the classroom. This paper attempts to live up to Fulton's challenge of furthering research in this area by utilizing observation, survey and interview techniques.

Regardless of the fact that there has been little research conducted on environmental effects in the adult classroom, adult educators have a wealth of practical experience in the daily ways the building or classroom environment can interfere or enhance the performance of students (Fulton). Part of the problem is, according to White (1972), few learning environments are designed specifically for adults. She insists that all of the physical attributes of a learning environment need to contribute to an "aura of adulthood" by contributing to a flexible setting allowing the learner to exercise control over the physical environment (Fulton, p. 48). For example, White suggests the use

of chairs in the classroom that can be moved by the learner, giving the student a way to move from location to location.

Ill-planned seating can also contribute to problems with small-group work in class. Physical encumbrances, such as fixed furniture, poor acoustics, and too much room space can inhibit the small group effectiveness that increases student morale, liking of the subject, and self-imposed discipline (Niece, 1988). Niece points out that when school structures and instructional ideals are in conflict, the resulting atmosphere can reinforce the school's mundane and unexciting image and negatively effect teacher energy and student creativity.

Goldman (1981) asserts that space utilization can enhance social climate by creating an atmosphere conducive to mutual support and thus contribute directly to retention, especially for underprepared students (Fulton, p. 50). Fulton does caution researchers from focusing on single variables, however, when studying classroom environment because generally more than one factor will contribute to the findings. He cites Aiello's (1976) work on crowding as an example of how easy it is to jump to hasty conclusions. According to Fulton (p. 51), Aiello found that while crowding in the classroom would ordinarily be considered detrimental; elderly adults, in fact, felt cozier, friendlier, and less-afraid in crowded rooms than in uncrowded rooms.

Since the specific "novel" classroom highlighted in this case study "moonlights" as a computer laboratory, it is essential to understand the impact the presence of computer technology can have on students. In giving pointers on how to design an instructional media center, Bunson (1988), stresses that correctly equipping a micro center requires creativity and planning, no matter what the size of the room or the budget (p. 29).

Technological artifacts in a classroom may not only create physical barriers, but instill emotional tensions beyond what is considered normal for a classroom situation. Sandra Champion, head media specialist at Hialeah High School in Florida, discusses the implications of "technostress," a modern disease of adaptation caused by an inability to cope with new technologies (1988). She explains that the awesome power of the ubiquitous computer is a threat to some, a challenge to others and, although individual responses to each viewpoint may differ, both turn the technopressure on (p. 51).

Computers do seem to have some positive or negative effect on young and old alike. For the student who is addicted to the computer, as well as the student who is fearful of this tool, facing a classroom full of terminals three times a week could reasonably cause undue stress -- especially since many students who shy away from computers specifically take courses that require no computer interface. What a surprise this person is in for when they find out that their non-computer class is taking place in a computer lab!

COMPUTER LAB/CLASSROOM OBSERVATIONS

To discover how much of an effect novel technological surroundings have on adult learners, I spent six hours observing an afternoon section of an undergraduate course that focuses on developing both expository writing and public speaking skills. During three of the observations, the class was giving speeches, on two occasions the instructor was lecturing on course material, and the last observation centered on a review session for an upcoming final exam.

Before discussing the interaction patterns observed, it is crucial to describe the layout of the room. This classroom at a large Midwestern University is a fairly unusual setting for a traditional expository writing and speaking course. The room is actually a computer lab that is open for student use during evenings and on weekends. The room predominantly consists of two long woodgrain-look tables, with each table holding twelve computer terminals (back to back). Students sit on office-style swivel chairs, each at a terminal. The screens of the computers are sitting on a shelf about 8" high. The computer's keyboard "tucks" under the shelf so it stays out of the way.

At the front of the room there is a long table that the instructor uses as a desk. Behind this table is a "markerboard." On the periphery of the room there are cabinets and several tables of computer printers. Although the room is fairly large and has very high ceilings, it appears cluttered. This may be due to the fact that all of the

equipment only comes up about waist-level, giving the visual impression that everything is crowded into one level of the room.

Other artifacts of this technological environment include computer-related posters and labeled circuits all along the walls. The equipment itself is rather nondescript-beige, but despite the bland coloring of the computers, they are hard to ignore.

Another unusual element of the lab is the fact that the door automatically locks whenever closed. During five of the six days observed, the instructor or a student had to go and open the door while the class was in session to let in a latecomer. On one day, near the end of the semester, the door had to be answered five separate times. While answering the door can become a distraction, the instructor commented he found it cut down on latecomers overall, because it put people "on the spot" when they came in late.

Interestingly, because of the barriers the computer terminals tended to create between students, my presence in the classroom was virtually unnoticed (almost unusually so). During the first visit, I was introduced to the class as someone who teaches public speaking and was interested in observing the class in general. Until the fourth visit, I was unnoticed by all class members. The instructor later mentioned that on one particular day he didn't even realize I had been observing the class. During the fourth visit, a woman sitting next to me bumped into my foot with her chair leg and did turn

to apologize. And, during the next observation, while study guides were being handed out, the man in front of me turned and asked if I wanted one. Ironically, as I was being re-introduced on the last day to facilitate the handing out of surveys, the man who was sitting right next to me turned and said in a surprised tone, "she was sitting next to me all along and I didn't even notice!"

The physical barriers that gave me anonymity, unfortunately also contribute to the isolation or grouping of students. One student appeared to be particularly isolated. Of the five times he was present during the observations, he always sat at terminal #24 in the far left corner of the room. Although he seemed to prefer the isolation, the computer terminal and the printing equipment behind him made it very easy for him to "hide." Also, because it is extremely hard to see the person sitting directly across the table from you due to the height of the terminals, students tended to talk only to those seated next to them. The only real exception to this involved the "center" row between the two tables. The people at these two tables tended not only to talk to those next to them, but to turn their chairs toward the center to form a semicircular arrangement. Several times students were observed talking over and across terminals, but this was infrequent. In all "talk-over" instances it appeared the students already knew each other prior to enrolling in the class.

These terminals not only prevented interaction across tables, but turned out to be quite an obstacle during student speeches. On the second and fifth days observed, I

sat at terminal #1, in the far right corner of the room. I was literally unable to see the teacher's table at the front of the room. As students spoke, it was impossible to tell if they were using the table-top podium, or if they were using notecards. Particularly frustrating was the fact that I could not see the speakers from more than waist-level, due to the blockage of the terminals.

An interesting pattern seemed to develop in terms of speaking skills. On all the speaking days observed, the majority of speakers had a rather "choppy" style of eye contact. It appeared the students were reacting to the "row" structure of the seating arrangement. Unlike other classrooms where students sit side by side, these students are divided by two computer terminals back to back. Therefore, speakers had to visually "skip" over the computers to have eye contact with the clusters of students on either side of the room. Toward the end of the semester, this eye contact became smoother in style, but it was still very "row" oriented.

Not only was my view of the speakers hindered, but so was the view of the instructor when he was up in front of the class. When he would sit at the table in the front prior to class starting, from most locations he was not visible at all. When he stood to lecture or lead a discussion, he was easier to see, but the view was always obstructed at some point as he walked across the room. Fortunately, the instructor used animated gestures and movement and it appears this kept students as attentive as was possible in this novel setting. By moving often, he was able to focus on different

areas of the room since that was not possible from the center of the class. When he wrote on the markerboard, his writing was large enough to read clearly, but depending on my location, it could be hard to see the board due to the computer obstructions.

Because the instructor is the only person all people in the room see at any given time, this had a profound effect on student interaction during question-and-answer sessions. Although students, for the most part, always appeared attentive to the instructor, they never looked at a classmate when that classmate asked or answered a question. Generally a teacher will take prime focus, and often students look to him/her as a "channel" for all responses, but this was more pronounced than anything casually observed in other classrooms. It took some work to actually spot where the student responses were coming from due to the barriers. This may be the reason students predominantly focused only on the teacher.

Since students seem to basically interact only with those next to them, and the computers create a "wall" from sight and sound, it was found that students could chat quietly during class more easily than in a traditional arrangement. During several of the class sessions, I sat at the far left, front of the room at a little table next to the students. The three to four students adjacent to me were often talking quietly amongst each other. However, when I was situated on the opposite side of the room, toward the back, only very light whispering could be detected. This physical layout makes it difficult for an instructor to maintain classroom decorum because it is nearly

impossible to actually see and hear what is going on at all times. Although things never got out of hand in the classroom, it is assumed that these small distractions could disturb students who are sitting nearby.

Interestingly, one of the most distracting sound elements of this "computer-lab" environment was the office-style swivel chairs. Virtually any time a student moved his or her chair it made either a squeaking noise, or one could hear the sound of the rubber wheels over the linoleum. Individual chair noise was not so bad, but 15-20 people all "rustling" around at the same time added up to a constant annoyance.

Other aspects of the equipment also created their own problems. Since the students were at tables, it made it harder for them to write. The space left in front of them on the table was hardly long enough to fit a notebook. This meant many of the students brought clipboards or used their backpacks as lap desks so they could take notes more easily. Notetaking was also hindered by the fact that the tables are situated vertically, in a horizontally-oriented room. Students had to choose whether they should turn their chair full front to see better, or to keep their chair facing the terminal, which meant losing their view of the front of the room.

Lastly, the students' interactions with the equipment will be discussed. This interaction wasn't common, but at times students did tap on the screen or play with the keyboard housed under the shelf. One episode with the equipment was especially telling.

During the last observation, before the door was closed, an unfamiliar woman just walked in the class and sat at Terminal #1. She turned the screen on and began to prepare her work for data entry. The instructor had to go over to the woman and inform her that the lab was closed and she would have to leave the classroom.

STUDENT SURVEY

Although the observations in the classroom touch on real issues, the most important piece in this puzzle, is the effect all this has on the students. To find out if the students had any direct awareness of the environment and if they found the atmosphere to be inconducive for interaction and learning, a survey was developed and administered to the students during the last observation.

Using the university's classroom evaluation booklet as a starting point, 10 questions were devised that would target the issue of class environment. Students were asked simple demographic information (year in school, gender). Students were also asked to indicate their anticipated grade in the course under the assumption that those who weren't doing as well as others might be more likely to label the environment as a factor in their lower grade.

To get at environmental factors, students were asked a series of questions that required them to circle the number (1-5) on a Likert Scale that most closely matched their reaction. Students were asked if: 1) the classroom facilities were adequate; 2)

the classroom was too small/too large; 3) the classroom provided a suitable environment for learning; 4) the computer equipment detracted from the quality of their work; 5) they had used the classroom as a computer lab on evenings or weekends; and 6) they felt comfortable working with computers. An open-ended section was included for students to share any additional comments they had on the presence of the equipment in the room.

STUDENT SURVEY RESULTS

All 16 of the students present that day took time to fill in the survey. Of the respondents, 5 were male, 10 were female, and one chose not to indicate gender on the form. All students were freshman. Fifteen of the 16 students anticipated getting an "A" or a "B" in the course. One person indicated they predicted a "C" on their grade report, but overall, this person's responses to other questions were not dramatically different from his/her classmates'.

The majority of the students (94%), found the facilities to be moderately adequate to very poor, with 50% of the students indicating the classroom space provided only a moderate to poor learning environment. Size, however, did not seem to be a factor in animosity, since all students felt the classroom was exactly the right size.

When asked if they felt the presence of computer equipment detracted from the quality of their work, 31% felt it did to some extent. On the other hand, 25% felt it barely

detracted at all. Of the 16 students surveyed, only two had ever used the facilities as a computer lab outside of class time, with both indicating they used it far less than once a week. What is interesting, considering these are freshmen raised in the "computer era", is the fact that 75% of them felt only moderately comfortable, at best, working with computers (6 of the 16 students indicated they were not at all comfortable working with computers). If Champion's discussion of technostress (cited earlier) holds, then this lab set-up could be potentially stressful for 75% of the class.

The eight students who included their personal insights on the environment via the comment portion of the survey, provided some interesting feedback on the situation. Of the eight comments, two were positive, one could be considered neutral, and five discussed the negative aspects of the classroom. The two students who commented positively about the environment brought up aspects of the classroom only someone who has given a speech from the front of the room could observe. One of the students found that the computers give the speaker the impression there are more "people" in the room while giving a presentation, which they felt was great. Another student liked the computers while speaking, but for the opposite reason. He felt the computers presented a blockade between himself and the audience, thus making it easier to speak.

The "neutral" student also commented on the fact that the computers made it look like there were "more people" in the room, but did not indicate whether that was a good or bad aspect of the situation.

Three students gave negative comments regarding the difficulty of trying to hold class discussions in this room. As one person noted, "It is too hard to have discussions while trying to look across the room through computers!" A fourth person commented on the fact that the computers separate students from each other and people tend to form groups. The last negative comment came from a student who quite succinctly stated, "If you use computers during class it's fine to have them in the room, but it's silly to have them and never use them!"

Overall, the survey results indicate that students are indeed aware of the classroom environment. Many of the comments were insightful, and showed that these respondents had thought about this issue prior to the survey. Although student responses did not always strongly echo my own observations in the room, there was enough of a parallel to indicate that further research in this area could produce relevant findings.

THE INSTRUCTOR'S TURN

An interview with the teaching assistant, who allowed his classroom to be observed for this exploratory study, was conducted to find out what he was doing on a day-to-day

basis to combat the environmental factors he was faced with. Since this was his first semester teaching, he had to rely on his own intuition and common sense to try to overcome the barrier of the computer terminals.

He stated that his best days in the classroom are the days when the students show a lot of involvement. Although he admits his performance as an instructor factors in the equation, student feedback also plays a strong role. He cited, for example, the day of the last observation as a "good day." During the review session he led there were lots of questions and the students seemed "up" on the answers and concerned. Despite this example, though, he commented that discussions almost always go better in his other class -- where he teaches in a "traditional" classroom setting.

The teaching assistant found the lab environment inhibiting for the students. "It's important people feel comfortable, and in this room they physically cannot connect," he explained. He has tried to adapt to this room out of necessity, but feels this isn't much leeway. One thing he has done on discussion days is try to get the students to all "wheel" their chairs to the front of the room in a semi-circle formation. There is limited room at the front of the class, but he has found this enhanced class interaction.

Another problem he found inherent with this situation is his own limited mobility. Despite the fact that he tries to keep his movement lively, there is only so far he can go. He tries to walk back and forth to make contact with all groups, but it is

impractical and awkward to walk down the sides or through the center of the classroom. In his opinion, not only has he had to adapt, but so have the students. The computers make it easy for them to hide, he said, which he thinks some students, unfortunately, may not mind. He also feels students must be thinking, "why are we in HERE?"

On top of the classroom environment factor comes the inconvenience of being an instructor who teaches in a normally locked computer lab. If students from the class following his walk in, he must either "shoo" them out, or babysit them until the next instructor arrives, since the assistants do not have their own keys and the lab must be attended or locked at all times. And, even though he commented that his class hasn't been known to fiddle with the computer equipment, he has had to stop students who come in after his class from doing so. One man, he said, was actually taking apart a "mouse" just to pass the time.

CONCLUSION

General estimates indicate that while about 75% of learning is accounted for by motivation, meaningfulness, and memory, the remaining 25% of learning is dependent upon the effects of the physical environment (Fulton, p. 48). For this reason alone, educators need to start taking a closer look at what is happening in their classrooms due to the physical surroundings.

For those who are faced with a classroom, like the computer lab, Darling (1990) offers strategies that may be useful. In her opinion, the first strategy is to try to get assigned to another room if you do not use computers as part of your class. "Students aren't dumb, they know they are not in an environment fit for what they are doing," she says, adding, "It's like having a cocktail party in a classroom. The students are aware of the conflict."

If the instructor is not able to change location, she recommends they incorporate computers into their curriculum, depending on how much they can actually do so. This tactic would help equalize the disequilibrium she explained, by using the environment appropriately for what the environment "screams" it should be used for. In addition, to stimulate student-to-student interaction, she said it would be helpful to use the computers interactively so that the students can communicate with each other on a project via computer, confirming that computers do belong in this classroom.

Note: The semester following this study, the computer lab was used to teach students only when they were working on computer-related projects.

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